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NEWS IN BRIEF**DEC foothold in Japan**

A SIGNIFICANT breakthrough into the highly protected Japanese public sector computer market has been scored by Digital Equipment Corp. The company has supplied a \$200,000 PDP-11/70 to the Japanese National Tax Administration Agency, which could lead to DEC winning major contract to equip 500 local income tax offices.

The computer was procured by the large Japanese computer and electronics company Nippon Electric, and DEC believes that the tax authority specifically requested DEC hardware. The move is seen as possibly heralding a relaxation of the government's strict buy-Japanese policy.

Fairchild launch

A NEW 8-bit ECL processed bit-slice microprocessor is to be introduced by Fairchild, together with a single chip microcontroller which will include EPROM on the chip. The company is pushing hard with its bipolar device developments, claiming that by the end of this year, a further 31 different circuits will be introduced that use its "fast" bipolar process.

Calcomp plotter

A DRUM plotter with a drafting speed of 42 inches per second, claimed to be twice as fast as any other drum plotter on the market today, has been introduced by Calcomp. Called the Model 1055, the plotter provides a resolution of 0.0005 inches and can operate offline with a Calcomp programmable graphics controller or online with most mainframes and minis.

IBM forecast

PREDICTIONS about which new products are expected from IBM in the next decade and which new markets and industries the company will enter are included in the latest State of the Art report from Infotech, entitled simply, "IBM".

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SA embargo 'a cosmetic gesture'

From Esmond Frank in Johannesburg

AT a time when there is pressure on the British government to introduce a ban on the sale of British-made computers to some South African organisations, details of a similar American ban have been clarified — although there are doubts in South Africa about its effectiveness.

An announcement published by the US Department of Commerce specifically prohibits sales of computers or computer components to South African police or military entities which are defined as the South African Police; the South African Defence Force; the Department of Prisons; Armscor, the State-

controlled arms manufacturing industry; the Bureau for State Security, and the South African Railways Police.

The embargo also extends to low enforcement officials and traffic inspectors employed by municipalities and provincial councils, since they perform the same functions as police in the US.

The computer embargo, which became operational in February, does not apply to the Department of Customs and Excise; the Department of Justice; licensing authorities, or the National Institute of Defence Research, which, according to the United States Department of Commerce, is not strictly a defence establishment since it carries out research for private as well as military organisations.

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And they add that the Cape Provincial Administration, with an American Univac, and the Transvaal Provincial Administration, with a dual Burroughs 6700, do not appear to have any difficulties in getting spares for their equipment even though

In his new position, Rhodes will lead a team working on large-scale communications and simulation projects.

Online end-user reporting software from Burroughs

ONLINE end-user reporting software, announced by Burroughs, is compatible across the complete machine range from B1700/B1800 systems up to B7700/7800 systems. Called Online Reporter, the software is an enhancement of the Audit Reporter Package introduced early in 1977.

The package is driven by simple English-like instructions, entered by the user at a VDU. It provides facilities for selective file access, file sampling, the creation of new files, and report totalling and printing.

CTL profits nearly doubled

CONFIRMING earlier reports that it achieved turnover in excess of £5 million in the year to April, 1978, Computer Technology has announced that pre-tax profit almost doubled to £36,000 on turnover up 25% at £5,032,000 in its last financial year. The company projects sales in excess of £8 million in the current year.

CTL did £1.5 million business in maintenance and services, and exports were £1.08 million.

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How to avoid that cow manure

THE computer industry is, as we all know, full of jargon and clichés (vide Angus McQuibbles article, CW, October 12). It also has a tendency for the vulgar term for which can, for polite company, be expressed as "cow manure."

To anyone in the industry

there are certain facts which are commonly assumed, such as the gross overselling of systems in the Sixties where there was little evidence available to seller or buyer that the systems could do what they were supposed to do.

As humorously illustrated in Programmer Notes (CW, November 2), project management of systems implementation has almost inevitably led to failure to meet deadlines and when the deadlines are met, it is usually found that there is a fault in the systems design which fails to take into account some aspect or other of user practice.

The communications media, including the Press and conference organisers, sometimes play a role in the cow manuring process by identifying, writing about, talking about and providing learned papers on important issues such as database, the micro revolution, etc.

Like those ordinary men who might read the letters columns of magazines such as Penthouse

and Forum and wonder "Why am I missing out?", people in the industry might well be led by the stream of information on the latest techniques (brought to a white heat by salesmen trying to achieve their budgets) to a desire to emulate the supposed achievements of others.

Putting on and taking off trends with the tempting speed of Penthouse models and their clothes, the computing industry has already lived through such "golden oldies" as database management systems and distributed processing and is now into micro and word processing, which are on the brink of becoming a bit old hat. There are also recurrent raves from the graves, like the much announced death of the punched card or dawn of the OCR era.

The vague conclusions of this report are worthy of notice, but too nebulous to be put into practice.

In practice, the only solutions (if any) will be found, firstly, when there is an improvement in

the educational level throughout the country, particularly among managers, on the subject of the reality behind the computing cow manure; and secondly, when the computing professional starts seriously attacking the question of good, reliable, user-oriented systems design.

On the wider awareness issue, there are signs — such as the Department of Industry micro education scheme, and awareness among unions and training agencies of the importance of this issue (CW, November 2) — that those responsible for implementing the action are getting the message.

On the question of improved professional standards, responsibility rests on all those who run and develop systems to take action.

And it is to be hoped that an

obligatory part of any training course relating to computing will include a guide on how to identify and avoid cow manure.

FOCUS

Spreading the blame

IN the legal world of contracts, the varied assortment of rights and obligations seems definitely loaded. In general the supplier wins the rights, while the user often picks up the obligations.

Maybe, however, the scales of justice are about to be tipped. As reported (CW, October 26), two organisations, the Computing Services Association and the Institute of Purchasing and Supply have both had working parties beavering away on matters of contract.

First report to surface is the CSA Contract Guidelines for the DPM in his neglect of the small print. Often, though, it is wilful pugnacity as to what it all means.

All too often, the procedures and regulations governing any particular contract can be overruled by the law of the land. Interfacing industry contracts with relevant legislation takes more than a single file sort.

Mybe it is time for installation management to issue some contracts of their own. These would be produced on standard print-out listing with a clause exempting any "bugs" which might have escaped notice. The first clause would exempt the installation from any equipment mishandling by the DPM team. While every endeavour would be made to keep the novice operator and/or computer trolley under control, subsequent responsibility is limited.

Particularly onerous are the restrictions as to use. Should it cross the DPM manager's mind to use the CPU as a drying closet, he would be well advised to desist. Should the shift leader consider replacing a blown fuse, again the advice is to refrain. Initiative should be discouraged. The manufacturers' memory banks are noted for their longevity, and any subsequent hardware problem will be identified with the recorded abuse.

As the thief left no forwarding address, and failed to fill out a proper order form, the program cannot tie things up nicely by sending off an invoice to the departed goods.

The moral is that deadly embraces, however tuneful, should be avoided at all costs.

Submitted by a frustrated record dealer, in Landan.

controller.

DP personnel should also be protected from the user — especially where late completion of their new applications are involved.

Taking the blame has become an accepted part of the DPM's life. Perhaps it is time that some of the blame was contracted round the industry.

software snags, whether compiled in Detroit, Cologne or Godalming, are at a loss when converting English legal niceties into a meaningful language. No wonder, then, that DP management often sign the contract hoping for the best; reasonable care in this case being that instinct suggests that the organisation concerned will honour its obligations, for not once has the problem of theft been considered — and that is what this saga is about.

At the warehouse of a well known record company, the stock records of all the platters stored there are held on a computer system. Some six weeks ago, the entire stock of one particular dity was stolen by a suitably unscrupulous person, so nothing now exists in the rock. However, there seems no way of informing the computer of this particular event.

This has led to a kind of impasse, or "deadly embrace," as some might say. The company cannot order any more from the record pressers, for the computer program says it still has some. Every time an order for the number comes in, the program promptly issues a dispatch note for items that don't exist.

And as the thief left no forwarding address, and failed to fill out a proper order form, the program cannot tie things up nicely by sending off an invoice to the departed goods.

The moral is that deadly embraces, however tuneful, should be avoided at all costs.

Submitted by a frustrated record dealer, in Landan.

IBM's charging for software 'could backfire' — Magnuson

AIMING for a rapid growth in UK market share, MAI has acquired its UK distribution, Four (UK) Ltd (CW, Oct 26).

There are three main MAI US business units, Corp, which manufactures markets a range of business systems under the Sorbus, a US-wide maintenance company. Wordstream Corp, which manufactures shared processing systems.

There are many little software companies out there just waiting for IBM to give them the opportunity to get into the system software business," he told Computer Weekly.

"By giving away the software, IBM has been able to achieve its objective of having one common centralised system control program for all customers. But as soon as it starts charging more than 10% of the hardware price for software, it will let the independents in. At 20% of the hardware price, a number of independents will start competing; a 40%-50% price ratio would let the whole world in."

The risk has not gone unnoticed at IBM — individuals have intimated in private that they are very worried about the problem, and are uncertain about the right approach.

With IBM's extremely aggressive pricing policy on its newest hardware products, particularly System 38 and 8100, the company appears to have decided that it must get a bigger return from software, but Magnuson underlined the dangers graphically.

"It takes, say, \$20 million to

get a hardware plug-compatible emulator off the ground, and the number of companies doing that is growing. But for software you need just one bright guy: in fact most of the best software products have been designed either by one man or by very small teams," he noted, citing CP67, the forerunner of VM/370, as an example.

Paul Magnuson expects the operating system on IBM's E-series replacement for low and mid-range 370s (CW, August 31) to be a superset of MVS with some modules available only at a monthly licence fee.

He also anticipates that the rapid decline in the price of hardware will continue right through the 1980s, so that within a decade, the E-series will offer a price-performance 25 to 30 times better than that available today.



NatWest DP chief

OVERALL responsibility for data processing and clearing operations at National Westminster Bank will soon be in the hands of Cyril Townsend, a former managing director of NatWest's Centre-line bureau, who is to become general manager of the bank's management services division on December 31.

He is currently chairman of NetWest's computer output microfilm bureau subsidiary, Eurocom Data (Holdings) Ltd.

Townsend's new job will include responsibility for Digital Equipment PDP-11 based message switching system called MS11B, in an £80,000 contract.

3,000 lpm impact printer talking point of Compec

AN impact printer running at a mind-boggling 3,000 lines per minute promises to be one of the prime topics of gossip around the bars and restaurants of Olympia next month.

The printer, called the DOC 3000, will dominate the Documentation stand at the biggest and best Compec exhibition staged so far. The DOC 3000 uses bond technology, and is offered as a low-cost back-up device to the IBM 3800 laser printer.

Compec, the National Hall, Olympia, will open on Tuesday, December 5, and close on Thursday December 7, those wanting to attend should apply immediately for free pre-registration tickets to attend having to pay £2 on the door. Applications should reach Compec Tickets, Room 821, Dorset House, Stamford Street, London SE1 9LU not later than November 22.

First export

THE Icelandic PTT is Secon's first export customer for a Digital Equipment PDP-11 based message switching system called MS11B, in an £80,000 contract.

Freedom of information setback

NO joy for the Freedom of Information campaigners came out of the Queen's Speech last week. Instead of any specific promise of legislation, the speech simply said: "It remains my Government's intention to replace Section Two of the Official Secrets Act, 1911, with a measure better suited to present-day conditions."

The speech continued: "The Government will continue to make information on public policy more readily available."

This will not satisfy those who want a statutory right to information established. Robert Kilroy-Silk, Labour MP for Ormskirk, said this was "disappointing, given the clear undertaking in the 1974 manifesto."

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PRIME

Research Machines to sell Z80 Algol in US

AN Algol compiler for Z80-based microcomputer systems is to be sold in the US by Research Machines, of Oxford, in what it describes as its "first positive step into exporting".

In addition to the Algol compiler, which runs under the popular CP/M operating system, the company will also be selling another CP/M software package, Z80 Assembler.

Other products to be offered include Algol compilers for DEC LSI-11, PDP-11, PDP-8, and PDP-12 machines. Originally written by Roger Abbott, of RFA Minisystems, these already have a number of US users.

The first outlet to be identified for the CP/M software is Lifeboat Associates, a New York-based software wholesaler and retailer. Run by Tony Gold, this is also the home of the CP/M Users Club library.

Research Machines is best known for its Z80 microcomputer system, based on the Zilog Z80.

Explaining the move into selling software on its own, director Mike O'Regan commented: "There is a strong interest in Algol-like languages such as Pascal and Coral. Typically, a microcomputer needs at least 56K of RAM to be able to run Pascal and this is beyond the limit of many systems and budgets."

"We believe that many users will turn to Algol itself to satisfy their requirement for a structured

language. Our Algol is capable of executing on microcomputer systems as small as 20K."

Research Machines' Z80 Algol also originates from RFA Minisystems and is sold by Research Machines under license. Both companies sell the complete range of compilers as a joint operation in the UK.

Inflation package

for Ireland

MARKETING and support throughout Northern and Southern Ireland for Safe Computing Software is to be handled by Beecon, the Belfast software house. SOFA stands for Safe's Overall Fixed Assets and is a batch system written in Cobol to run on

Downtime
by Chad

Ruthless EOJ routine

I KNOW Americans have a reputation for being ruthless, but it's seldom one gets such a graphic experience of this first hand as I had when I was visiting Los Angeles recently. I was standing in the queue for the hotel desk when I noticed the two out-of-state American gentlemen in front of me were having difficulty with their reservation. They insisted that the booking had been made by their firm. Eventually the manager was called, and he arrived carrying a telex sent to the hotel by their "employer."

"This," said the manager, waving the telex before them, "says that the reervation has been cancelled because you don't work for them any more."

What a way to give someone the sack! The last I saw of the two gentlemen, they were being ushered away to the manager's office in a state of understandable shock. Remember that, the next time you complain about your heartless employers!

Fit of the gigos

THE DP industry is getting old enough now for people to reminisce about the Good — or Bad — Old Days. An acquaintance of mine was talking about his years in the late fifties at an IBM installation at a drug company in Hounslow. They were having a lot of difficulty with accuracy of input data, and he set about investigating the staff selection procedures.

Among the denizens of Hounslow, it appeared that those school leavers who could get good jobs would travel to central London for these. Those left would be employed by this firm to deliver the internal post.

Of these, the girls who kept leaving the letters at the wrong offices, or dropping them down the drains, were put in the post room, sticking stamps on letters.

Finally, those who kept putting the stamps on the wrong corners, were made data prep operators.

The management, of course, were very impatient with the computer, which didn't seem to be delivering the goods. To paraphrase the old tag, "Who prepares the data preppers?"

Participative systems design

A BCS survey of DP user requirements was highly critical of the failure of systems designers to include the views of all users in their design specifications (CW, November 2).

A technique of participative systems design aimed at overcoming this type of criticism has been created by three specialists in computers and systems management, ENID MUMFORD of the Manchester Business School, FRANK LAND, senior lecturer in computers and systems analysis at the London School of Economics and JOHN HAWGOOD, director of the computer laboratory at Durham University.

Their technique sprang from a project initiated by the National Computing Centre about eight years ago to look into the economics of computer systems. The more they looked into this subject, the more they realised a depended primarily on

the way the system was designed. These techniques have now been implemented at a number of user sites and specially commissioned series of five articles. Mumford, Land and Hawgood will describe technique, drawing on their implementation experiences of the technique, which they will video "new design methods to cater for this climate of democracy in industry."

Taking users' needs into full account

DESIGNING systems is a complex and demanding process. Designing systems for a new and rapidly developing technology is also an evolutionary process, one which involves constant learning as new or changing needs are identified in the system environment, and an intellectual approach which works well at one time ceases to be effective at another.

The design of computer systems today is being increasingly influenced by major social and technical changes. Socially, there has been a shift of power from the top to the bottom of most organisations. This has been accompanied by increasing demands for involvement in decisions that affect lower level workers on the shop floor or in offices and a willingness to use employee power to block change which is viewed as undesirable or disadvantageous in particular change which is seen as leading to a reduction in jobs.

Technically, the advent of microprocessors, while increasing the potential scope and flexibility of computer systems, seems to some to augur a realisation of the worst employment fears of the past.

The design of computer systems is therefore becoming a negotiating process in which all interested groups require a role in the analysis of needs, setting of objectives and design activities.

For many types of applications the day of the lone systems designer is over. Therefore new design methods are required to cater for the new climate of democracy and to ensure that users receive the kinds of systems that meet these needs, because they have had a responsibility for the design of the systems.

The values of user groups will influence the manner in which they respond to computer systems and their enthusiasm or reluctance to ensure that they work. But values today are in a state of flux, and this is one reason why there is pressure to reformulate these and to develop the new approaches and techniques that will fit a new, and more humanistic, set of values.

and work situation can and should be set up in such a way that he or she can do a job that is personally satisfying in a safe and comfortable environment. (The computer can and should be a means for assisting this.)

All systems design is influenced by people's values and philosophy. Top management values will influence the kind of



Enid Mumford

approach involves first creating a structure to assist consideration of long-term corporate strategy. When organisational objectives have been set, a broad system covering a range of departments is developed, then a design group, consisting of all the representatives of all the departments, can and should be considered in planning it.

3. That employees at all levels can and should analyse their own and their clients' needs and design their own work systems.

Sackman describes the systems design scene of the 50s and 60s in the US in the following way:

"The developing computer ethos assumed an increasing misanthropic visage. Technical matters turned computer professionals: human matters turned them off. Users were troublesome petitioners somewhere at the end of the line who had to be satisfied with what they got, because after a substantial investment, they usually couldn't go elsewhere."

The situation of the 1970s has been very different, but still apparently unsatisfactory. In Britain most systems designers have tried very hard to meet user needs and provide the kinds of systems that users will welcome and appreciate, but frequently they have failed to do this and have been met with a hostile reception from management and subordinates alike.

Job satisfaction gains, because the group whose job satisfaction is going to be affected by any change is better able to highlight its own job satisfaction needs than any outside group of specialists.

Efficiency gains, because the people who are in the change situations are likely to have an excellent knowledge of day-to-day work problems and can make useful contributions to the solution of these.

If users are going to participate in the design of their own systems, then they need both a structure to assist their participation and a set of simple analytical and design tools.

The approach is based on a clear value position, which can be stated in the following positions:

1. That the individual's work

approach involves first creating a structure to assist consideration of long-term corporate strategy. When organisational objectives have been set, a broad system covering a range of departments is developed, then a design group, consisting of all the representatives of all the departments, can and should be considered in planning it.

3. That employees at all levels can and should analyse their own and their clients' needs and design their own work systems.

4. A method for identifying significant trends and opportunities.

5. A method for assessing likely benefits of different strategies to different groups.

This assists the choice of an effective course of action for all groups.

6. Detailed socio-technical systems design to ensure the final system meets user needs as well as technical and organisational objectives.

The final article will discuss our existing approach and indicate developments we are now working on.

Briefly, the participative

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Banks see big savings in cheque scanning system

THE massive cheque handling workload borne by clearing banks could be substantially lightened by a system that captures and processes electronic images of cheques. The system is called Bancr, a name which combines the names of its joint developers, the Bank of America and NCR.

No details have been released yet either of the hardware or software components of the Bancr system, but one of the known essential features is a terminal that will be installed at each bank branch and which will be used to scan both sides of each cheque deposited at the branch, transmitting the image

to a regional cheque image sorting centre serving typically about 50 branches.

The system at the centre will be capable of extracting information that requires computer processing, like the amount,

from the rest of the image and displaying it so that an operator can capture it for DP purposes. The information could then be transmitted to the bank's computer centre.

In this way Bancr would be a viable and more acceptable alternative to the Electronic Funds Transfer System, EFTS, concept where cheques are totally eliminated, because Bancr dramatically reduces the amount of cheque handling, while enabling the customer to continue using his cheque book.

Banks in the UK see the biggest benefit of Bancr being the elimination of the need to sort actual cheques and transport them physically to the branches they are drawn on in order that the signatures on them can be verified.

Some of the benefits of Bancr anticipated by the Bank of America include reduced energy and fuel consumption, reduced paper consumption and the increased ability to handle rising cheque volumes without sacrificing speed, accuracy or control. Bancr would reduce or greatly alleviate the problems caused by individual cheques being misplaced.

The Bancr development effort within NCR is concentrated at the company's special systems development centre at Torrey Pines, near San Diego in California. Problems being tackled there include extracting information from "picture" cheques, where the decorative picture can be confused with the relevant information on the cheque.

Exam papers contract

A CONTRACT worth £77,000 for automatic marking of 700,000 exam papers has been completed by Lewinnes-Ajex, the Craydon bureau, for the Matriculation Board of Nigeria.

The exam answer sheets, submitted by 100,000 students, each contained multiple choice answers to 100 questions. The huge task of marking them, and from the results assigning to the

students the 20,000 university places available, was given to Lewinnes-Ajex after the Matriculation Board had seen the bureau's advertisement in Computer Weekly.

In addition to calculating each student's mark, the computer system had to apply standardisation formulas to bring the levels of 18 different examinations into line.

DEC announces 3271

interactive software link

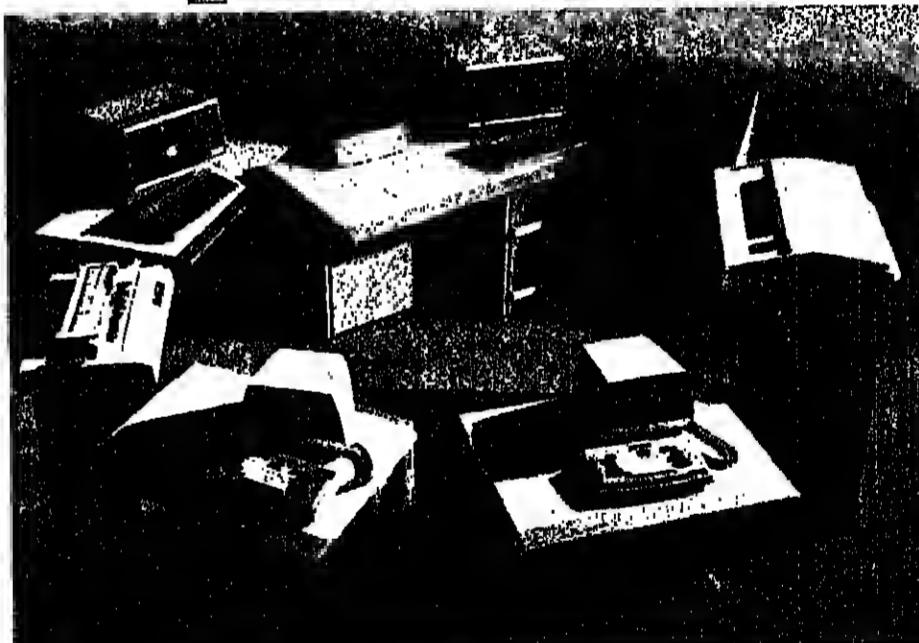
AN IBM 3271 protocol emulator

PDP-11 emulators. Priced at £3,050 with full documentation and support, the package can also be purchased unsupported for £2,025. Multiple-share licence-only price is £1,215.

Ulster rights

HAVING gained no satisfactory agreement with Queen's University, Belfast, over negotiating rights for its 350 members there, of whom 90 are computer staff, ASTMS has passed the dispute to the Labour Relations Agency, the Ulster equivalent of ACAS.

CMC SOVEREIGN here, now, for power and performance



CMC SOVEREIGN with MPK

A. PROCESSING TERMINALS - these operate independently because of their (32k) minimum microprocessors. Each can be used for supervisory functions, as a communications controller, or for the support of fine or serial printers. Additionally users can create and run

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MICHIE'S PRIVATEVIEW

Where the
genius of
calculating lies



THE one thing that a calculating prodigy is not particularly good at is calculating. Yet in a very precise and well documented sense, that is the fact of the matter.

There is a general truth about the nature of highly trained intellectual skill, which seems a little obvious once it is stated, namely that if you are obliged to operate on problems with a computer made of jelly, you are likely to develop rather strange computational strategies.

Facts such as the one cited above seem to administer a jolt nonetheless. People forever slip back into the assumption that the brain's raw bit-handling capacities, in the case at least of sufficiently gifted and trained practitioners, are the equal of at least an 80 mips Cray-I machine. I call this the "van Dusen delusion", after the hero-detective of the early French thrillers of Jacques Futrelle.

Reviewing one of these (*"Bloody Murder"*) Julian Symons tells us the following: "He (Professor Augustus S. F. X. Van Dusen) is introduced to us when he refers contemptuously to chess, saying that a thorough knowledge of the rules of logic is all that is necessary to become a master at the game, and that he could, in a few hours of competent instruction, make a man who has devoted his life to it a game arranged between the Professor and the world champion, Tschakowsky. After a morning spent with an American chess master in learning the moves, the Professor plays the game. At the fifth move Tschakowsky stops smiling, and after the fourteenth, when Van Dusen says "Mate in fifteen moves, the world champion exclaims: 'Mon Dieu! (he is not one of those Russians who knows no language but his own), and adds: 'You are not a man; you are a brain — a machine — a thinking machine'."

To calculate a mate in fifteen knowing nothing but the moves would occupy the Cray-I for something like 10^{10} years of continuous running. The age of the solar system is but a flash by comparison, a mere 10^{10} years or so, so that it is hard not to feel sympathy with Tschakowsky. Had he known more physics Tschakowsky would have realised that the great detective's performance was not just super-human but actually supernatural, since limitations to do with the speed of light and the atomic dimensions of matter decree that NO machine could ever perform the feat which he had witnessed, not even a "thinking machine".

Although the van Dusen delusion is its more rampant in the matter of processing power, the onlooker tends to endow the expert's brain with equally impossible properties also of store. Just as lightning calculating prodigies do not calculate any faster than you or me, and chess-masters do not analyse numbers of moves in the forward tree of possibility,

so the professional memory men electrify large audiences without in fact having any better or worse raw memory than the next man. Somehow the audience convinces itself that the performer is actually storing and addressing each atomic item, just as though he had some vast 10¹⁰ bit RAM inside his skull.

Larry Lorayne in his "How to Develop a Super-Power Memory" opines that anyone can acquire the same gift just by working hard enough to study his mnemonic rules, or any similar mnemonics. Such rules centre round the systematic formation of associations for pairwise linking of concepts, coupled with the use of imagined sequences of events, i.e. stories. This latter was regularly explained by ancient Greek orators for learning a speech.

The textbooks on rhetoric add reading through the speech while perambulating an accustomed terrain, one's house and courtyard for example. Each time the speech was recited, the same journey would be made, until each sentence was tagged by association with a familiar spot.

When finally launched on the speech the orator need only imagine himself sauntering over the route, and as in his mind's eye he passes each familiar sight, the corresponding passage of text is triggered from memory.

Ridiculous, weird, obscene, violent and generally far-out images make the best associations. Suppose that my private mnemonic code for the first ten numbers is "Nought is for sport; one is a bun; two is a shoe; three is a tree; four is a door; five is a hive; six is Westbrook; seven is Heaven; eight is a date; nine is for wine", and someone speaks fairly slowly the following number to me with the idea that I should later recall it: "803, 735, 204, 381, 092". The memory-man's approach is to put together a rapid mental scenario in which the digits are spoken, something like this, say: "An all-in Wrestler but she gets up into a tree thinking to make it to heaven, but falls out of the tree onto a bee-hive getting bees into her shoe which pours into her shoe drowning the bees all end happy".

This power to apprehend patterns in a flash, reminiscent of a Grandmaster's glimpse of a chess position, was the basis of what Hunter called the "First phase". Aitken's response to a problem was divided into two phases. During the first he was occupied in rummaging through his well stocked pattern-memory for components with which to synthesise a calculative plan. During phase 2, or "run time" as we might say, he was executing the plan by doing the specified calculations in sequence. But the sequence proceeded, as measured by the rate at which he uttered successive digits of the solution, at roughly the same speed at which anyone else would have performed it.

So calculation itself is not where the calculating prodigy's genius lies. Program synthesis, not the program, is the heart of the matter.

Reference: Hunter, I.M.L. (1952) An exceptional talent for calculating. *Brit. J. Psychol.* 43, 243-253.

Donald Michie

Puzzler

NINE programmers are detailed to work on a rush job which is scheduled to take 12 days. Evaluating sessions will be necessary for three people on

each day. To distribute this extra duty fairly, the chief programmer writes out a rota in which each one of the 36 possible pairs of

programmers is required to work on one evening, and one evening only. Can you formulate a suitable rota? Answer on page 61.

SOFTWARE FILE-1

BP buys package for Jackson method

A COBOL pre-processor which supports the Michael Jackson structured programming method has come into the limelight with the sale of the package to BP. And Michael Jackson Systems is preparing to market the software more

chosen for an afternoon presentation just one week later by Ian Sharpe, head of the other major APL timesharing company, I.P. Sharpe Associates. Sharpe will speak on November 17 on APL, communications, and the development of APL over the next ten years.

Those wishing to attend on another day should contact Peter Cyrex at ICL Dataskill (Reading 543588) or MRK Goodall at Chelmsford (Horsham 50101). The UK APL User Group is a specialist group of the British Computer Society.

The same venue has been

understand the Michael Jackson design method," the spokesman observed.

He added that the package automatically performs a number of optimisations, particularly those concerned with saving space. For example,

where several SELECT options shared the same exit-action, the software would generate a common action-call, branched by GOTO.

Mostly written in JSP-Cobol itself, the package includes packed assembly. It is thus fully portable, being available currently for Univac 1100, IBM VS, OS, and DOS systems.

"If people are going to mess around with the generated Cobol, then they have failed to

Why Ellerman replaced proprietary TP monitor after two years

THE deficiencies of ICL's online systems philosophy are cited by Ellerman Lines, the shipping firm, as the immediate reason for its decision to replace a proprietary TP monitor just two years after first installing it.

At the heart of the problem is the roll-in/roll-out mechanism advocated by the company for use under MTS on its small 2904 miniframes.

"We found Cortez an excellent environment for developing TP applications. The version we have, however, is not multi-threading and I don't regard the enhanced software, Cortez-Plus, as a true multi-threading monitor either.

Ellerman Lines two years ago bought two 2904s, which serve as remote sites through a 7502 controller. At the same time it bought Zeus Hermes' Cortez TP monitor, to support anticipated high-volume TP applications.

Low-volume inquiry routines were to be implemented as stand-alone programs under MTS.

The spokesman explained

that another factor in the decision to convert to TPS was Ellerman Lines' need to install an online program development system. Telecomputing's active Operator (Software, October 13, 1977) considered TPS with only a slight additional overhead.

"Having decided to change our approach, and taking into account our projected workload, performance was the critical factor," said a spokesman. "We wanted to put out TP on the most efficient basis possible.

"Assuming that they are there are many approaches to improving system performance, for example tuning the monitor. I am sure we could have sorted out the problems given the chance."

However with four such programs implemented, the company found that the query response time varied unpredictably when batch work was running, rising on occasion to as much as a minute. This was attributed to the roll-on-roll-off overhead.

The only way to achieve a predictable response time was to lock the inquiry programs in place. With a total of eight inquiry programs projected, this approach was ruled out because of the cost of buying the extra store required.

Instead, the firm decided to adopt a single program approach, using overlay, while at the same time installing Telecomputing's TPS. A major factor was the performance

Councils to use US vehicle fleet management system

A US-developed vehicle fleet management system has been acquired by the Local Government Operational Research Unit, LGORU, for future use by local authorities in the UK. The software may also be sold to other ICL miniframe users.

Called Fleet Management Package, the software serves the needs of transport and workshop managers for information on vehicle life, repairs, fuel consumption, and preventative maintenance.

It was developed by Public

Technology Inc, one of LGORU's partners in the International Urban Technologies Exchange Program.

LGORU acquired UK and marketing rights to the software after investigation revealed no similar package was currently available. It has entered an agreement with ICL on sales to ICL users.

Instead, the firm decided to adopt a single program approach, using overlay, while at the same time installing Telecomputing's TPS. A major factor was the performance

of the first user of the system, Northumberland County Council, which will implement the existing IBM version.

The problems, which are sizeable, are placed at a key point in Jon Kerridge's article on microcodas (Software Techniques, CW, October 28). The second paragraph on p.34 should have begun with the sentence: "In the same way that a program is a sequence of instructions, a microprogram is a sequence of micro-instructions."

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OP SPOT

A package for program function keys under DOS

PROGRAM function keys, which often save IBM OS/VS operators much unnecessary typing (Op Spot, CW August 17), may be used to similar effect in the DOS and DOS/VSE environments.

The software package which makes this possible is called Logout and is available from Macro 4, a software house in Wallington, Surrey.

This piece of information will be of particular interest to the shift leader who contacted me a while back to discuss PFKs in relation to his system, an IBM 370/138, under DOS/VSE, Relenae 34.

In a letter to Op Spot Keith Piper, a programmer at Macro 4, explains:

"Logout operates with any standard, unmodified, DOS/VSE supervisor and does not entail renaming or changing job control, attention routine or any other IBM supplied component."



Piper

With Logout the keys are defined at IPL, or load, time and may not be modified online.

Continues Piper, "Logout will display the text associated with each key but, quite deliberately, does not allow the text to be altered. After some discussion, we decided that setting the values at IPL time gave the flexibility needed, without the risk of accidental alteration."

Each key may be assigned up to 30 characters and the text modified before submission.

Says Piper, "The text may represent a complete input message or just a prefix to a message. Since Logout PFK support operates by adding the text to the beginning of any input typed by the operator, the concepts are identical." He gives the following explanation:

Reprint and analysis programs for the hardcopy file.

specifications: "...PF8=D RDR", PF12=MSG F2", ...

"Now to enter D RDR, FREE (a commonly used POWER/VSE command) the operator types FREE and hits PF6.

"The attention routine displays 'D RDR, FREE' and processes the command as required. To enter 'MSG F2', he simply hits PF12."

Other features include:

Timestamping each message on the log (in a Virtual Machine environment the CPU-ID is included).

Message suppression, which writes unwanted messages to the hardcopy file, but omits them from the log itself.

Time limiting, and progress reporting.

Reprint and analysis programs for the hardcopy file.

HINT OF THE WEEK
Check all job control cards yourself

BEFORE feeding a large batch job (in terms of the number of data cards submitted) into the card reader, scan the deck for any errors in job control syntax. In this way it might be possible to prevent the job being flushed by the system as a result of an error.

Now some might contend that it is the responsibility of the job control section to check the cards in this manner but, to me, that is a weak argument.

Firstly, a lot of time is wasted in sending the job back to the control section for correction.

Secondly, the unfortunate operator will have to re-enter the job to the system, anyway.

Thirdly, by examining each deck in this manner the operator will become adept in spotting errors and will add to his expertise.

Queueing listfiles on same printer

THE George 3 operating system will sometimes offer a number of alternative solutions to an operations problem, providing staff are willing to make use of its facilities and employ their own technical expertise.

I say this after considering some comments from Geoff Westcott, a programmer and former senior operator. He writes to Op Spot in response to a letter from Roy Cosway, senior systems programmer at the Truro site of Cornwall County Council (Op Spot, CW October 12).

Cosway called for better communication between operations and programming, and gave an example of what this can achieve. He described a situation in which George 3 intends to print payrolls on two printers, simultaneously, but the operators want only one unit to be used for that purpose.

He went on to explain how the system programmers, once they knew about the problem, were able to make a small change to the operating system and save the operators a lot of typing at the console.

Now Westcott feels that altering the operating system is "rather complicated" and puts forward an alternative solution.

"When I was an operator had a PROPERTY of ONELP, which was set PERMANENT, INCLUSIN

Gives the coding:

- 1) PR ONELP (PERM, INCL)
- 2) AU 14, PRONELP

According to Westcott, PROPERTY may be used to good effect when it relates to list more than one printer, special stationery, using the printer. He gives an example:

- 1) LF PAY1, *LP, PRONELP & ONELP
- 2) LF PAY2, *LP, PRONELP & ONELP

Says Westcott, "Now only one of the printers, PROPERTY although both listfiles will be sent to the same printer and is requested to load payrolls issued."

Pointing to the result, specifying INCLUSIVE, he continues, "Listfile comes which do not request this PROPERTY may also make use of the printer to which it is attributed."

As a DP manager, you're probably more aware than most of the great computer paradox.

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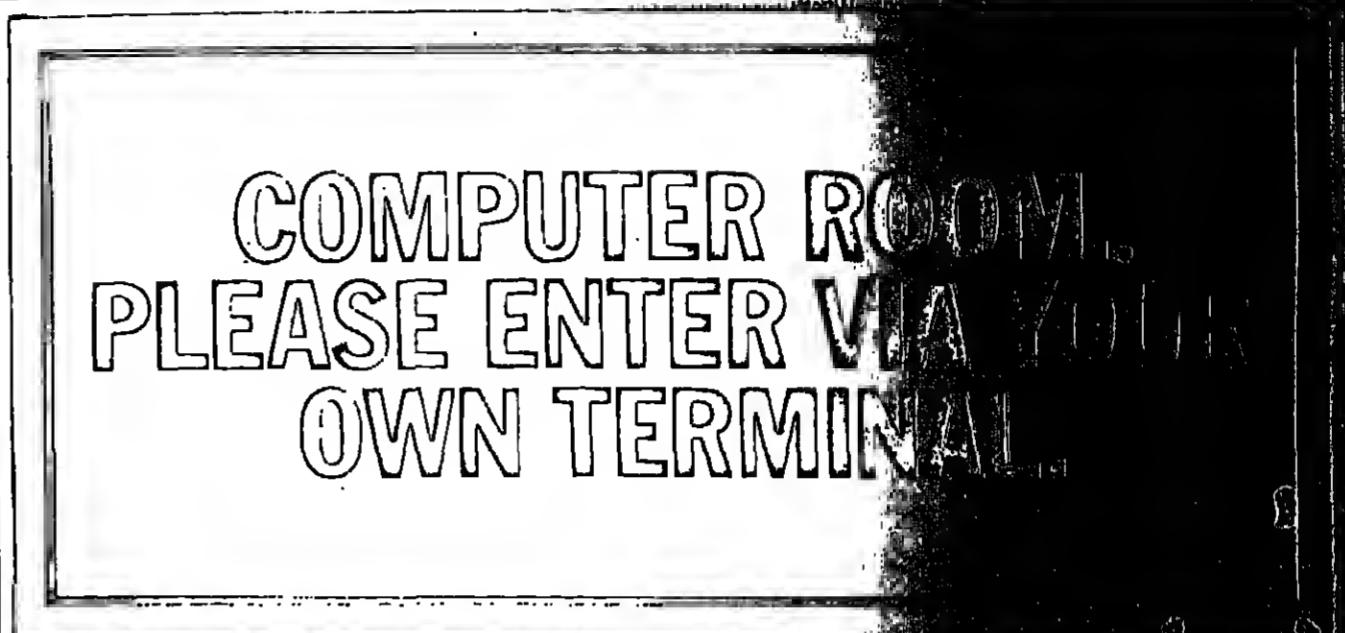
THE NEW SYSTEM/38 HIGH PERFORMANCE EXTRAORDINARY VALUE

removes the usual restrictions on the size and number of multi-tasking programs.

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Its extensive in-built security

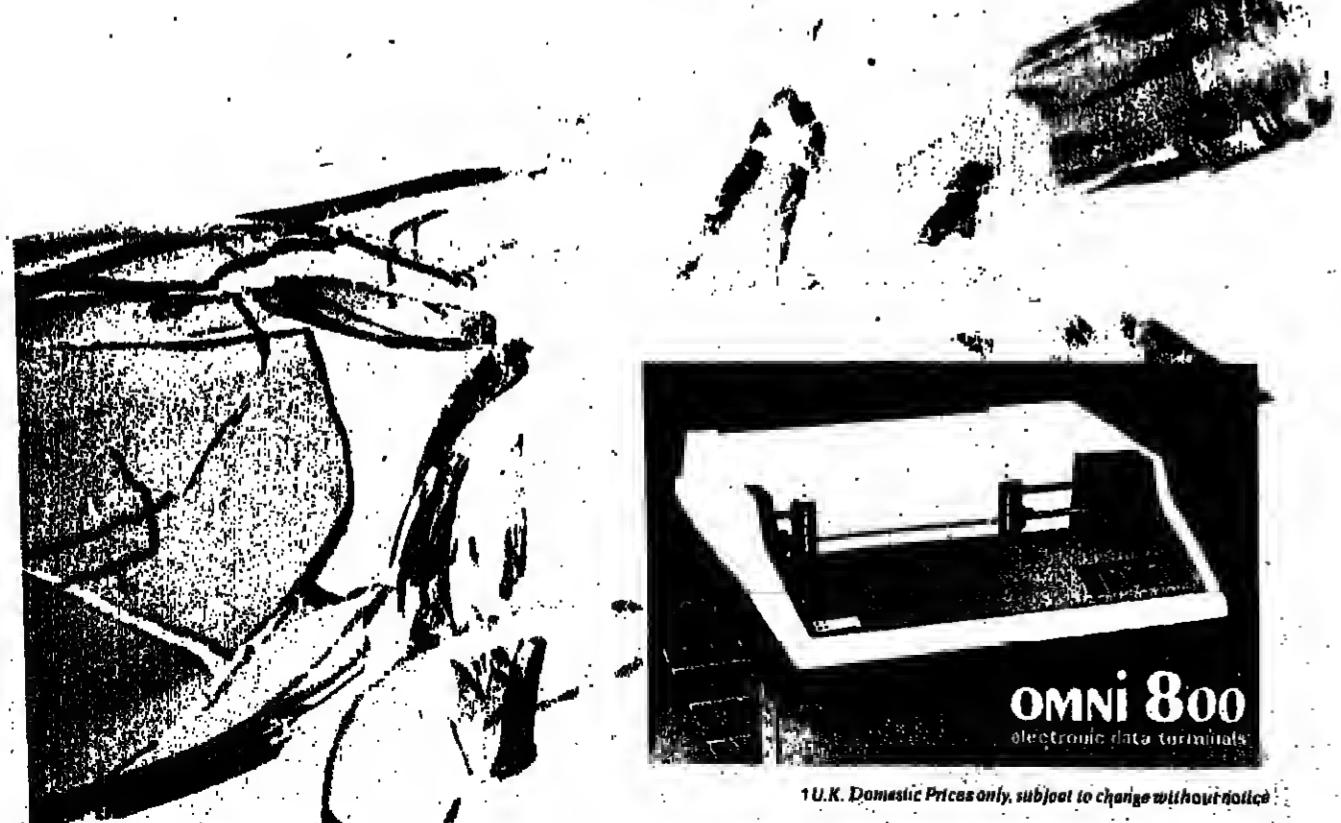


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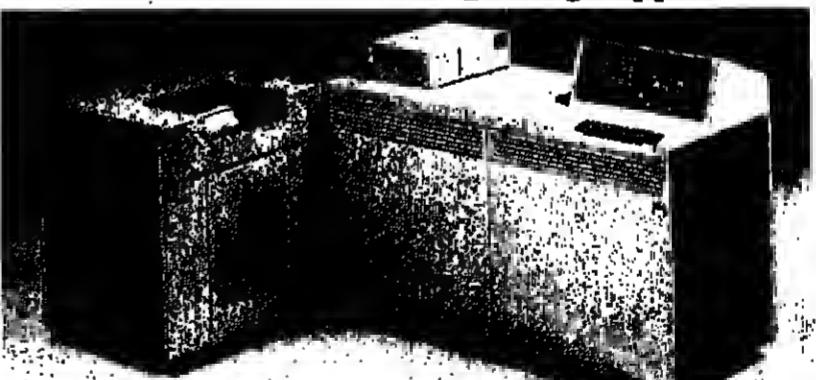
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PEOPLE AND EVENTS

Woman appointed director of NCR

A MATHS professor at New York University, Cathleen Morawetz, has been appointed to the board of directors of NCR in the US.

A Canadian by birth, Dr Morawetz, is a member of the US National Research Council's Advisory Board to the Office of Mathematics Sciences and of the US National Science Foundation's Advisory Panel for Mathematical Sciences.

She has been a Guggenheim Fel-

low, a member of the Council of the Society for Industrial and Applied Mathematics, chairman of the Committee on Women in Mathematics of the American Mathematical Society, and Chairman of the curriculum committee of Princeton University's board of trustees.

Dr Morawetz is also a trustee,

of the council and member of

the executive committee of the American Mathematical Society.

Olivetti UK chairman

A NEW chairman has been appointed at British Olivetti. He is Ettore Lotti, who earlier this year was appointed to the main board of the Italian Olivetti parent company.

Lotti spent some years in the US, with American Gas and Electric Service Co, and as chief of the Italian Technical Delegation in Washington. He then became a director of the Banca Nazionale del Lavoro, and in 1963 was appointed the Group's deputy director-general in Rome.

He has served as chief executive, and as chairman of Rilunione Adriatica di Sicurtà and of Assicuratrice Italiana.

At present he is vice-chairman of Manufacturers Hanover of Credit Commerciale Italiano and of EFI Banca, and a director of EMI Europe.

Four more staff have been appointed within the same group at Systime. They are senior software engineer Alan Scott, previously an analyst/programmer with Digital Equipment Scotland; and software engineers Les Wilson from Associated Weavers, John Elliott from Hawkhill Siddeley, and John Gardner from CSC.

Appointed personnel manager

to Rossing to work on a team of three who are developing accounting and management systems.

Barry Cerrington, recently appointed head of AIM Microsystems' manufacturing group, has been made vice-president of manufacturing based in California.

Victor Levina has left UCSC, where he was business development manager, to go freelance as a planning, strategy, acquisitions and joint venture consultant, primarily to computer service companies.

Paul Draper, senior consultant at RTZ Computer Systems, has returned to the company's Bristol office after a year's assignment as DP manager to RTZ's mining plant, Rosling Urenium, in Namibia. Glynn Prosser, who has joined RTZ as a systems analyst from Dorset County Council, has been seconded

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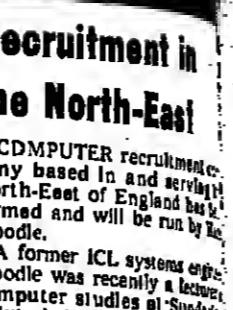
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with Systime is Ron Napier, formerly personnel executive with Plesey Marine.

William Shifford has been appointed special systems software engineering consultant with Systime. His previous post was with the academic research staff of UMIST, where he had project responsibility for the implementation of a real time system and was also researching for his PhD on computer-based image pattern recognition techniques.

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DIARY

NOVEMBER 15 Microprocessors. Dr K. G. Pearson, Institution of Mechanical Engineers Applied Mechanics Group, IMechE, 1 Birdcage Walk, London SW1. 17.30.

NOVEMBER 14 Real time computing systems and languages, luncheon workshop. Digital Equipment, Japan West House, Toltenham Court Road, London W1. 12.00.

Computers and privacy. Sir Norman Lindop, IEE, Savoy Place, London WC2.

Recent developments in computer security. Dr J. Horwitz, BCS Croydon branch, Peckover House, Croydon. 18.15.

Structured programming. Ian Scouller, BCS Harrow sub-branch, Hatfield Technical College. 19.30.

NOVEMBER 16 Computer equipment for the 80s. J. R. Plastow, BCS Cobol Group, BCS HQ, London W1. 14.15.

VIS-NEWS. IOPM, Vines, Cumberland Avenue, London NW10. 18.00.

Visit to American Express, BCS Sussex branch. Brighton. 19.30.

How to produce an operating system, perhaps. M. Wright, Dept of Computer Studies, Peckover House, Sheffield City Polytechnic. 14.00.

Software for the small machine. R. R. Waller, BCS Belfast branch, Wellington Park Hotel, Belfast. 20.00.

NOVEMBER 18 Computer auditing. A US perspective. Donald Adams, BCS London branch, Waldorf Hotel, London WC2. 18.00.

Computer-generated art and music. J. Landwein, BCS Guildford branch, Stoke Hotel, Guildford. 19.30.

Programming languages. Cora, 80, Pascal, RTL/2, PL/I, Fortran, M. Jackson, John Smith, BCS Heriot-Watt University Health Park Hotel, Edinburgh. 19.30.

Impact of information systems on organisational thinking. Bob Tricker, BCS Oxford sub-branch, Europa Motor Lodge Hotel, Oxford. 18.45.

Student evening. BCS Coventry branch, Lanchester Polytechnic, Rugby. 19.30.

NOVEMBER 17 Computer simulation and psycholinguistics. Dr G. Cohen, Computation/Linguistics, University of Oxford, Dept of Experimental Psychology, South Parks Road, Oxford. 17.00.

Details: Mrs S. M. Hockey, tel: 0865 50721.

NOVEMBER 18-22 Micro II. IEEE Computer Society, Monterey, California.

NOVEMBER 20 Computer languages, the way ahead. Tony Hoare, BCS Nottingham branch, Chemistry Bldg, Nottingham University. 19.15.

NOVEMBER 20-22 Development in distribution switchgear, conference. IEE/IEEE/IMA, Savoy Place, London WC2. Register with IEE, 01-240 1871.

Formal specification of organisations. R. Carpenter, BCS Formal Aspects of Computing Research Group, Polytechnic of Central London, London WC1. 18.30.

How decisions get made. Managing projects, seminar. Association of Project Managers, Waldor Hotel, London WC1. 10.00.

Details: Mrs S. M. Hockey, tel: 0865 50721.

NOVEMBER 21 Portable communication systems, colloquium. IERE, Royal Institution, London W1. 10.00. Registration necessary, phone 01-383 3071, ext 16.

Formal specification of organisations. R. Carpenter, BCS Formal Aspects of Computing Research Group, Polytechnic of Central London, London WC1. 18.30.

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NOVEMBER 22 Computer languages, the way ahead. Tony Hoare, BCS Nottingham branch, Chemistry Bldg, Nottingham University. 19.15.

NOVEMBER 22-23 Database management systems. Information retrieval. Prof Paul Elizabeth Barracough, BCS London branch, London SW7. Reg: Tel: Christine Mouling 01-837 0471.

NOVEMBER 23 Database management systems and structured systems development and quality control seminar. John Parker, BCS London branch, London SW7. Reg: Tel: Christine Mouling 01-837 0471.

NOVEMBER 23-24 Local Authorities Group & Computer Users' Association. Tally Ho, Tallite Road, Streatham, London EC1.

Visit to Ford Motor Co, BCS Hampshire branch, Swindon. 14.00.

Information engineering and electronics. F. J. Lever, IEE/IEC, St Mary's College, Cheltenham. 10.00.

Databases. I. Draffan, ICR, Ticehurst, East Sussex. 19.30.

Programming languages. I. Dr J. Larkham, J. Lucking, Polytechnic of Wales, BCS S. Wales branch, Polytechnic of Wales, Treftadaeth, 14.15. Details: 01433 405133.

Electronic funds transfer, the role of automated automated clearing services. R. Hope-Smith, BCS Wolverhampton branch, The Polytechnic, Wolverhampton. 18.30.

Visits to Manchster Computer Workshop, BCS Manchester branch, Hamming Ditch, Manchester. 10.00. Numbers limited, contact R. Barker, 01-822 5471.

NOVEMBER 24 Semantic coherence as the language of understanding. Dr N. L. Compton, Dept of Experimental Psychology, South Parks Road, Oxford. 17.00.

Details: Mrs S. M. Hockey, tel: 0865 50721.

NOVEMBER 25 The BBC television. Kelly, IERE, London SW1. Tropical Medicine, London SW1.

An introduction to computer putting. Dr P. O'Connor, BCS S. Wales branch, Huw Morris House, Weston-super-Mare. 18.00.

Online stock recording at Phillips, British Product and Research Control Society, Royal Observatory, London SW7. 18.30.

NOVEMBER 26 Semantics and the language of understanding. Dr N. L. Compton, Dept of Experimental Psychology, South Parks Road, Oxford. 17.00.

Details: Mrs S. M. Hockey, tel: 0865 50721.

NOVEMBER 27-28 Development in distribution switchgear, conference. IEE/IEEE/IMA, Savoy Place, London WC2. Register with IEE, 01-240 1871.

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NOVEMBER 28-29 Computer languages, the way ahead. Tony Hoare, BCS Nottingham branch, Chemistry Bldg, Nottingham University. 19.15.

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A black and white collage of computer hardware and documents. On the left, a monitor screen displays the word 'OLICO'. Below it is a keyboard. To the right is a printer with the brand name 'Dataprinter' visible on its paper tray. Further right is a stack of papers or documents, with one prominent document featuring a large 'FOR SALE' sign.

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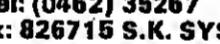
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RELATIONAL DATABASES

How fourth normal form files can be constructed



Part 3

By Max Stewart

This is the third in a 10-part tutorial series on databases and structured file design, by Max Stewart, the divisional technical support manager for Leyland Vehicles, the commercial vehicle division of BL.

THIS week we will define fourth normal form files and show how they can be constructed.

Relational Files. In conventional file design, one value of the key field (or fields) uniquely identifies one record. In files designed using relational database principles, each file has a key (or keys) which correspond to the more precise definitions given in Part 2. The following rules apply to such files:

• Each key data item (or concatenation of data items) in a file has either an n-to-1 or a 1-to-1 relationship with every non-key data item in that file.

• Each non-key data item in a file depends upon (each) key item. If a key is a concatenated key, each data item not within that key depends upon the whole key and not just part of the key.

• Each non-key data item in a file is not related to any other non-key data item in that file.

• If a key is a concatenated key, each item within the key participates in an indirect relationship. The meaning of an indirect relationship is discussed later in this series.

Note again that a file may have more than one key and such keys may be concatenated keys. These rules can be summarised succinctly (if not entirely accurately) by the following aphorism: "Each non-key data item depends upon the key, the whole key, and nothing but the key."

Corollaries of the four rules are that in each file:

1. There are no repeating groups.
2. Each non-key data item depends upon the key or keys. If the key is a concatenated key, the non-key data item depends upon the entire key but not on any part of the key; no part of such a key is redundant. This is called "full" dependence and the key is called a "full" key. If there is more than one concatenated key, each item within each key depends fully upon each other key.
3. No data item depends upon n key in another (non-key) data item.
4. No data item which is part of a concatenated key is unrelated to any of the remaining data items in that key.

Normal Forms. A file which satisfies corollary 1 is said to be in first normal form. A file which satisfies corollaries 1 and 2 is said to be in second normal form. A file which satisfies corollaries 1, 2 and 3 is said to be in third normal form. A file which satisfies corollaries 1, 2, 3 and 4 is said to be in fourth normal form.

Note that files in any of the normal forms may have only one record type.

Direct and Indirect keys. A non-key data item which satisfies corollary 3 is said to be directly dependent upon the key, and the key is said to be a direct key for that data item.

A data item which depends upon a key via one or more intermediary data items is said to be indirectly dependent upon the key, and the key is called an indirect key for that data item.

Example: In the relationship diagram in Part 2, ORDER-NO is a direct key for CUSTOMER and an indirect key (via CUSTOMER) for SALESMAN.

Candidate keys. If a data item C depends upon a data item A and also upon another data item B (and if A and B are related), A and B are said to be candidate keys for C. Note that A and B do not merely form a concatenated key for C; either A or B alone is a key for C. A and B are in a 1-to-1 relationship.

Example: If Figure 1, Part 1, had an ITEM-CODE field as well as ITEM and each ITEM-CODE were unique to a particular ITEM, both ITEM and ITEM-CODE would be candidate keys for DESCRIPTION.

Performance considerations apart, fourth normal form (FNF) files represent an ideal file structure, and the notion of candidate keys leads to a precise definition for such files. Since there may



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